Using Large Shared Displays to Create a Collaborative Classroom Learning Environment

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Overview

- Goals and Motivation
- Implementation
- Current Status
- Future Work
- Conclusions

Goals and Motivation

- Better lecture context for students
- Make more effective use of student's personal laptops in the classroom
- Assist in in-class note taking
- Facilitate student presentation of their work to others in the class
- Collaboration on in-class work
- Utilize graphics and simulations that cannot be achieved in a traditional classroom setting
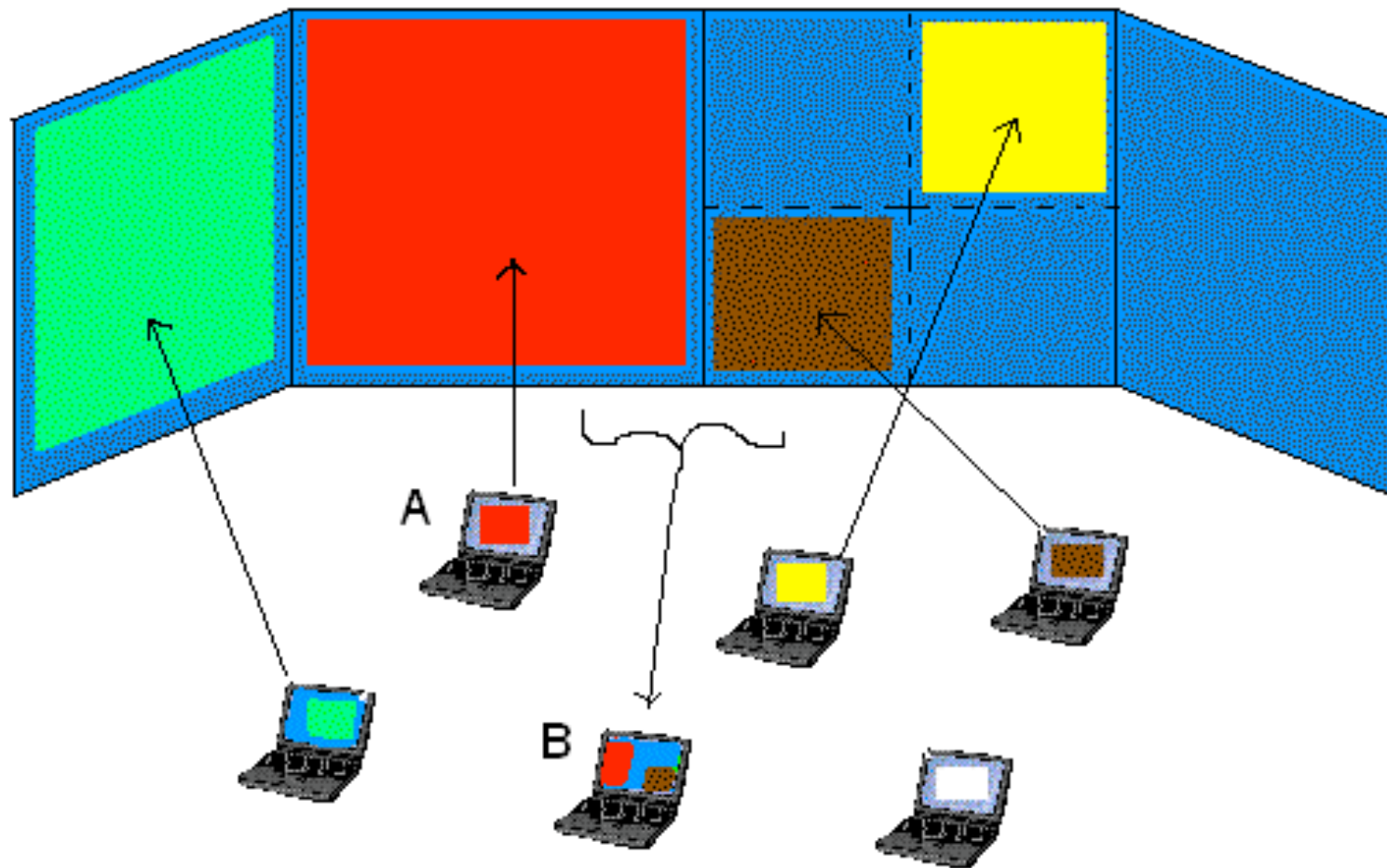
Architecture

- Software on both Student and Instructor Machines
- Student machines can be Windows, Unix / Linux, Mac, etc.

Modes of Operation / Display Space Management

- Instructor Mode
- Laptop Presentation Mode
- Collaboration Mode

# Interactive Mural

Instructor Mode

- "Management" mode
- Provides an interface to monitor, manage, shared tiled display
- Supports monitoring of the progress of student work
- Support showing of selected student work

Instructor Mode

- Major Operations
  - Enter & Leave Instructor Mode
  - Kill any existing displays
  - Enlarge any specific student display to a specific tile or grant permission for them to launch their own display
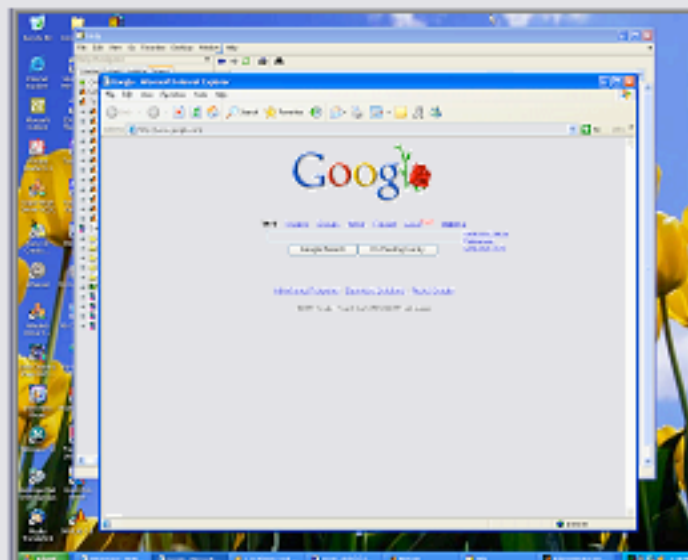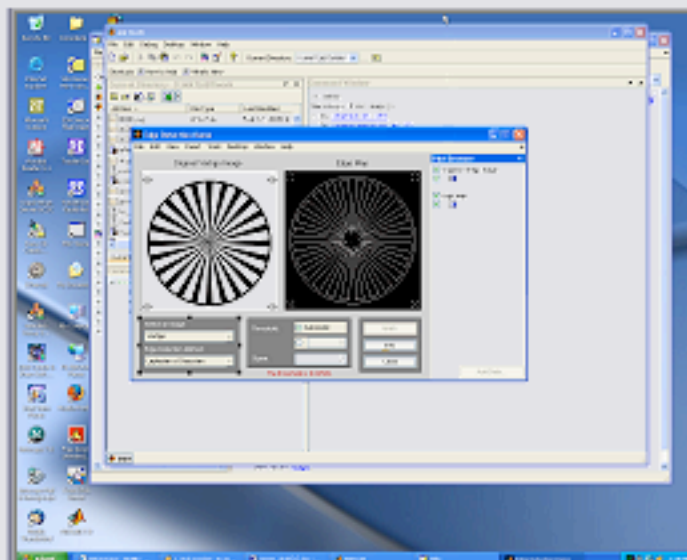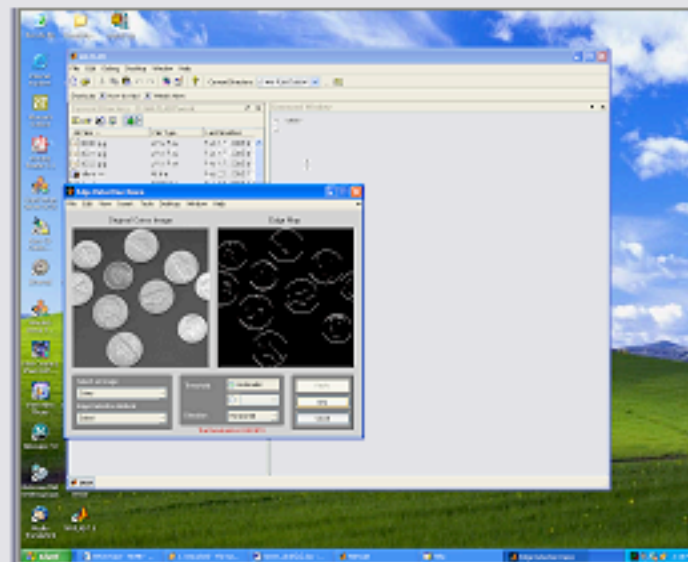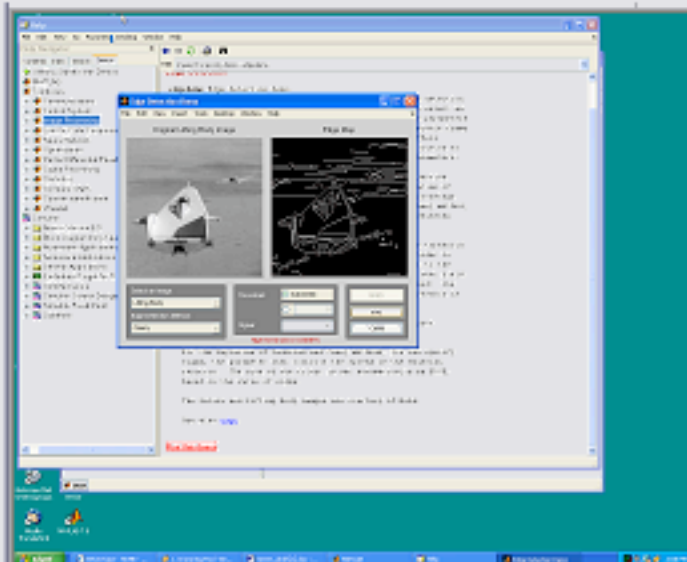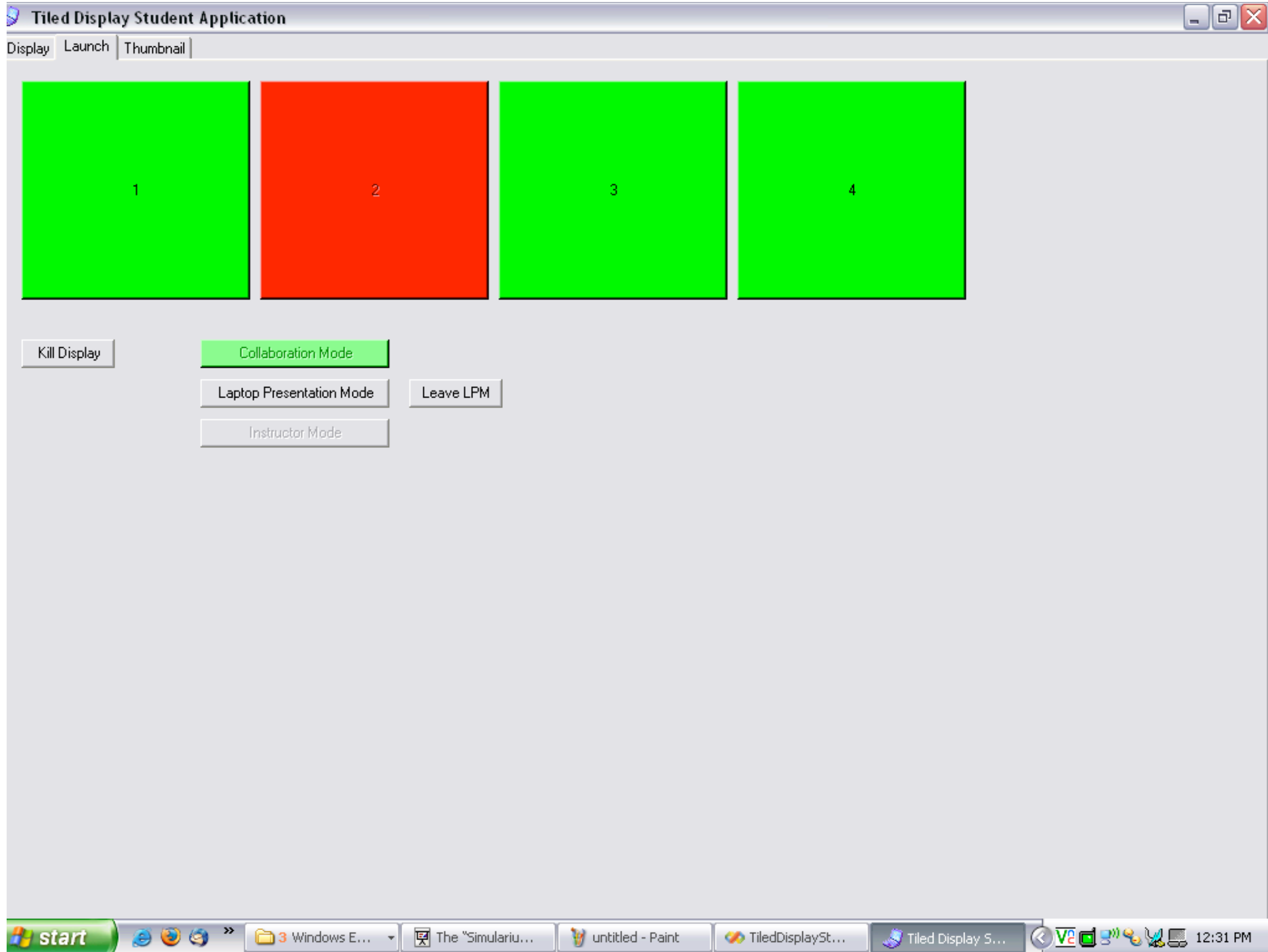
Laptop Presentation Mode

- Single person, either the instructor or someone enabled by the instructor, who is to present to the entire classroom
- Gives control of the display to the presenter
- Prevents others from disrupting the presentation
- Prevents projector and laptop compatibility problems

Collaboration Presentation Mode

- In-class collaboration
- Ad-hoc group research
- Tiling of windows vs. window overlay
- Actual tiles as reference point
- Snag-it like functionality to capture any desired part of the display + thumbnails
- Display occupancy and mode is shown in a convenient format

Temporal Logic (AFTER) Demonstration

Getting Started with Demos

About the Demos

To Run Demos

Function Alternative

start   3 Windows E...   The "Simulariu...   untitled - Paint   TiledDisplaySt...   Tiled Display S...   12:28 PM

Tiled Display Student Application

Display | Launch | Thumbnail

| 1 | 2 | 3 | 4 |

Kill Display

Collaboration Mode

Laptop Presentation Mode   Leave LPM

Instructor Mode

start   3 Windows E...   The "Simulariu...   untitled - Paint   TiledDisplaySt...   Tiled Display S...   12:31 PM

VNC – Virtual Network Computing

- Software abstraction of a computers frame buffer over a network connection
- Lazy updates vs continuous video stream
- Open Source
- Each student runs a VNC server on their laptop. The tiled display system provides an interface to remotely open and manage a VNC viewer based on the request of the user

Student Software

- Connect to tiled display
- Display / zoom on tiled display
- Capture tiled display segment
- Annotation / Note taking
- Enter laptop presentation mode
- Leave laptop presentation mode
- Permit instructor access to student display

The Simularium

- 100 seat experimental classroom / laboratory
- 4 x 1 Array of Front Projection Tiles for 5 + million pixels
- Single Windows XP workstation with 2 dual head video cards

Future Work

- Testing performance and scalability issues
- Cater to tablet pc use and inking capabilities
- Deploy this software in a live classroom setting and run usability studies

Conclusions

- Great potential for collaborative learning
- Facilitate in class sharing of work
- Simulations and visuals will help bridge the gap between theory and practical methods presented in the classroom
- Redirect student attention from in class note taking to learning and comprehension